

REMARKS

Claims 1-30 were pending in the application. Claims 1-21 were rejected. Claims 22-30 were provisionally withdrawn and are canceled. Claims 1, 3, 5, 8-12, 16, and 17 are amended. Claims 31-39 are added. Claims 1 and 31 are the independent claims. Reconsideration of the amended application is respectfully requested.

The Examiner asserted that the application claims two distinct inventions, and required restriction. Provisional election to examine the invention recited in claims 1-21 had previously been made. This election is confirmed, and withdrawn claims 22-30 are canceled.

The Examiner rejected claims 1, 2, and 5-14 under 35 USC §102(a) as being anticipated by Wilkinson et al. The Examiner also rejected claims 3, 4, and 15 under 35 USC §103(a) as being unpatentable over Wilkinson et al.

Independent claim 1 recites a method of improving the performance of a direct feed fuel cell having an anode comprising a CO-tolerant catalyst, a solid polymer electrolyte, and a cathode. The fuel cell normally provides power in a range from a minimum output to a maximum output. A supply of fuel is provided to the anode for the oxidation of the fuel to produce an oxidation product and electrons at the anode. A supply of oxidant is provided to the cathode for reduction of the oxidant, thereby producing a reduction product. The output power of the fuel cell is reduced at predetermined time intervals to be less than the normal minimum output. Thus, the fuel cell provides output power within an operating range, except during predetermined intervals in time during which the output power is reduced to a level that is below the normal minimum operating output level.

In contrast, Wilkinson et al. disclose a method and apparatus for operating an electrochemical fuel cell with periodic fuel starvation at the anode. The term “fuel starvation” refers to operating a fuel cell with reduced reactant supply, particularly at a reactant fuel rate that is not sufficient to maintain a constant electrical current. As noted in the abstract, localized portions of the fuel cell anode are momentarily periodically fuel starved, while the remainder of the fuel cell anode remains electrochemically active and saturated with fuel such that the fuel cell is continually available to generate power. Thus, where the claimed invention reduces the output power of the fuel cell during predetermined intervals such that the output power falls below an operating range, Wilkinson et al. periodically fuel starve portions of a fuel cell anode while keeping the fuel cell output within the operating range.

The Examiner cited Wilkinson et al. claim 1 and column 2, line 65 *et seq.* as disclosing the elements of Applicants’ claim 1. Wilkinson et al. claim 1 recites periodic fuel starvation of the anode, but also recites that the fuel cell continues to produce electrical power during the fuel starvation. Taken in context of the abstract and the written description, it can be fairly inferred that this power production falls within the contemplated operating range, not below it. Column 2, line 65 through column 3, line also does not disclose reduction of the output power to a level below the operating range.

The Examiner further cites column 11, lines 43 *et seq.* as disclosing periodic reduction of the fuel cell power output. In this example, the fuel cell is periodically fuel starved, resulting in respective reduction of the output voltage, as shown in Fig. 8. However, Wilkinson et al. do not disclose that the power output drops below the operating range. In fact, the conclusion reached by Wilkinson et al. based on the results

of this example is that it is possible to periodically starve the fuel cell while still generating a continuous supply of power. See column 12, lines 1-7.

In summary, Applicants claim a method of operating a fuel cell such that the output power falls below an operating range for predetermined intervals. Wilkinson et al., on the other hand, disclose a method of operating a fuel cell in which a portion of the anode is periodically fuel starved, while the output power remains in an operational range. Applicants and Wilkinson et al. have opposite objectives, and therefore satisfy their respective objectives using different processes. It is respectfully submitted that Wilkinson et al. do not anticipate the invention recited in claim 1. Claims 2-15 depend from claim 1, and therefore also cannot be anticipated by Wilkinson et al. The rejection of claims 1-15, therefore, should be withdrawn.

The Examiner rejected claims 16-20 under 35 USC §103(a) as being unpatentable over Wilkinson et al., in view of Lyons. The Examiner also rejected claim 21 as being unpatentable over Wilkinson et al., in view of Lyons et al., and further in view of Finkelshtain. Lyons discloses an electrolytic cell. In the passage cited by the Examiner, the cell is connected to a load by way of a switch, which is opened and closed at a rapid rate to disconnect and reconnect the load from and to the cell. However, it is Wilkinson's stated goal that operational power to the load should not be interrupted. The entire purpose of the Wilkinson et al. invention is to fuel starve the fuel cell in order to remove impurities, while at the same time not interrupting operational power. Thus, to combine the teachings of the cited references would frustrate the intentions of Wilkinson et al. Further, because the stated purpose of Wilkinson et al. is opposite that of the claimed invention, it can be fairly asserted that Wilkinson et al. teach away from the claimed

invention, and therefore it would be improper to attempt to combine the teachings of Wilkinson et al. with those of any other reference in an attempt to render obvious the claimed invention.

For at least the foregoing reasons, no combination of the cited references is proper, and therefore no such combination could render obvious the claimed invention. The rejection of claims 16-21, therefore, should be withdrawn.

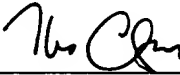
New claims 31-39 are added to recite the claimed method. For at least the reasons stated above, it is respectfully submitted that claims 31-39 are allowable over the cited prior art.

Based on the foregoing, it is submitted that all objections and rejections have been overcome. It is therefore requested that the Amendment be entered, the claims allowed, and the case passed to issue.

A petition for extension of time is submitted herewith, along with a check in payment of the extension. If the check is missing, or made out for an insufficient amount, please charge any deficiency to our deposit account, No. 501998, and notify us accordingly.

Respectfully submitted,

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Date



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